

REMARKS

The applicant respectfully request reconsideration in view of the amendment and the following remarks. The applicant has incorporated the features of claim 6 into the claims. No new matter has been added.

Claim 19 is objected to as being improper dependent form for failing to further limit the subject matter of previous claim. Claims 1-12, 14-19 are provisionally rejected as being unpatentable over copending Application No. 11/576,309; or 11/846,964 in view of US 6,296,797 (Ziegler), and in view of US 2001/0041772 (Masubuchi). Claims 1-12, and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ziegler, in view of EP 1 118 458 or US 6,517,949 (Mutsuda), and in view of Masubuchi. The applicant respectfully traverses these rejections.

Rejection of claim 19

Claim 19 is objected to as being improper dependent form for failing to further limit the subject matter of previous claim. The applicant has cancelled this claim. For the above reasons, this rejection should be withdrawn.

Double patenting Rejection

Claims 1-12, 14-19 are provisionally rejected as being unpatentable over copending Application No. 11/576,309; or 11/846,964 in view of US 6,296,797 (Ziegler), and in view of US 2001/0041772 (Masubuchi.).

Obviousness-type double patenting as defined is when claims in a patent application are not patentably distinguishable from claims in a patent (MPEP 804). The test applied to

determine obviousness-type double patenting exists is whether or not the claims in the application define merely an obvious variation of the invention disclosed and claimed in the patent (In re Vogel and Vogel, 164 USPQ 619 (CCPA 1970). If claims are unobvious over 35 U.S.C. §103, there can be no double patenting (In re White and Langer, 160 USPQ 417 (CCPA 1969)). The Examiner refers that these claims overlap or at least encompass each other. The Examiner has apparently confused domination with double patenting. Domination occurs when a patent has a broader generic claim which reads on an invention defined by a narrower or more specific claim in another patent. Domination is not double patenting, per se. Domination is an irrelevant fact since a later invention may be validity patented though dominated by an earlier patent (In re Kaplan, 229 USPQ 678 (CAFC 1986)). Further, the overlapping of claims is not a significant or controlling factor in obviousness-type double patenting (In re Longi et al., 225 USPQ 645 (CAFC 1985)). The proper consideration of obviousness type doubling patenting is the improper extension of the patent right. The applicants believe that these applications are patentably distinct for the reasons stated below.

The claims in '309 application are as follows:

1-21. (Canceled)

22. A composite body comprising a polyacetal portion and a modified thermoplastic vulcanizate portion bonded together, wherein the modified thermoplastic vulcanizate portion comprises a modified thermoplastic vulcanizate elastomer having a hardness of 30 to 90 Shore A and **wherein the modified thermoplastic vulcanizate elastomer comprises:**

(a) 2 to 75% by weight of an at least partially crosslinked ethylene-propylene-diene rubber in from 1 to 50% by weight of a polyolefinic matrix further comprising 0.05 to 10% by weight of an ingredient selected from the group consisting of stabilizers, crosslinking aids, and mixtures thereof;

(b) 1 to 30% by weight of a compatibilizer; and

(c) 10 to 70% by weight of a non-olefinic thermoplastic material,

all percentages by weight based on a total weight of the modified thermoplastic vulcanizate elastomer.

23. The composite body according to claim 22, wherein the modified thermoplastic vulcanizate elastomer has a compression set value after 24 hours at 70°C of less than 65%.

24. The composite body according to claim 22, wherein the composite body has a peel resistance of at least 0.5 N/mm.

25. The composite body according to claim 23, wherein the composite body has a peel resistance of at least 0.5 N/mm.

26. The composite body according to claims 22, wherein the polyacetal portion comprises a polyoxymethylene copolymer.

27. The composite body according to claim 22, wherein the modified thermoplastic vulcanizate elastomer further comprises one or more additional components selected from the group consisting of plasticizer oils, organic fillers, inorganic fillers, reinforcing materials and combinations thereof.

28. The composite body according to claim 22, wherein the non-olefinic thermoplastic material comprises a polymeric material selected from the group consisting of thermoplastic polyester urethane elastomers, thermoplastic polyether urethane elastomers, thermoplastic polyesters, thermoplastic polyesterester elastomers, thermoplastic polyetherester elastomers, thermoplastic polyetheramide elastomers, thermoplastic polyamides, thermoplastic polycarbonates, thermoplastic polyacrylates, acrylate rubbers, styrene-acrylonitrile-acrylate rubbers, and mixtures thereof.

29. The composite body according to claim 22, wherein the polyolefinic matrix comprises polypropylene.

30. The composite body according to claim 22, wherein the component (a) of the modified thermoplastic vulcanizate elastomer has an unreacted crosslinking agent content below 0.1% by weight, based on the total weight of the modified thermoplastic vulcanizate elastomer.

31. The composite body according to claim 22, wherein the compatibilizer comprises a component selected from the group consisting of functionalized styrene-olefin block copolymers, methacrylate-butadiene-styrenes, methyl methacrylate-acrylonitrile-butadiene-styrenes,

functionalized ethylene-propylene-diene rubbers, ethylene-propylene rubber, functionalized polyolefins, and mixtures thereof.

32. The composite body according to claim 22, wherein the polyacetal portion comprises a molding and the modified thermoplastic vulcanizate portion forms at least a partial coating of the polyacetal portion.

33. The composite body according to claim 22, wherein the polyacetal portion comprises a molding and the modified thermoplastic vulcanizate portion comprises a further molding bonded onto the polyacetal portion.

34. The composite body according to claim 22, wherein one of the polyacetal portion and the modified thermoplastic vulcanizate portion is bonded to the other portion by injection molding.

35. A composite body comprising a **polyoxymethylene copolymer** portion and a modified thermoplastic vulcanizate portion bonded together, wherein the modified thermoplastic vulcanizate portion comprises a modified thermoplastic vulcanizate elastomer having a hardness of 30 to 90 Shore A and wherein the **modified thermoplastic vulcanizate elastomer comprises:**

(a) 2 to 75% by weight of an at least partially crosslinked ethylene-propylene-diene rubber in from 1 to 50% by weight of a polyolefinic matrix further comprising 0.05 to 10% by weight of an ingredient selected from the group consisting of stabilizers, crosslinking aids, and mixtures thereof;

(b) 1 to 30% by weight of a compatibilizer; and

(c) 10 to 70% by weight of a non-olefinic thermoplastic material,

all percentages by weight based on a total weight of the modified thermoplastic vulcanizate elastomer; wherein the modified thermoplastic vulcanizate elastomer has a compression set value after 24 hours at 70°C of less than 65%; wherein the composite body has a peel resistance of at least 0.5 N/mm; wherein the polyolefinic matrix comprises polypropylene; and wherein the compatibilizer comprises a component selected from the group consisting of functionalized styrene-olefin block copolymers, methacrylate-butadiene-styrenes, methyl methacrylate-acrylonitrile-butadiene-styrenes, functionalized ethylene-propylene-diene rubbers, ethylene-propylene rubber, functionalized polyolefins, and mixtures thereof. (emphasis added)

36. A process comprising:

(a) providing a first molding; and

(b) bonding a second molding to the first molding by an injection molding application;

wherein the first molding comprises one of a polyacetal material and a modified thermoplastic vulcanizate elastomer, and the second molding comprises the other of the polyacetal material and the modified thermoplastic vulcanizate elastomer; and wherein the modified thermoplastic vulcanizate elastomer comprises:

(i) 2 to 75% by weight of an at least partially crosslinked ethylene-propylene-diene rubber in from 1 to 50% by weight of a polyolefinic matrix further comprising 0.05 to 10% by weight of an ingredient selected from the group consisting of stabilizers, crosslinking aids, and mixtures thereof;

(ii) 1 to 30% by weight of a compatibilizer; and

(iii) 10 to 70% by weight of a non-olefinic thermoplastic material;

all percentages by weight based on a total weight of the modified thermoplastic vulcanizate elastomer.

37. The process according to claim 36, wherein the second molding comprises a coating of at least a portion of a surface of the first molding.

38. The process according to claim 36, wherein the injection molding application comprises a multi-component injection molding process.

39. The process according to claim 38, wherein the first molding comprises the polyacetal, wherein the first molding is preheated to a temperature of from 80°C to less than its melting point prior to bonding of the second molding, wherein during the bonding of the second molding the modified thermoplastic vulcanizate elastomer has a melt temperature of 170° to 270°C, and wherein the process is carried out in a mold having a mold temperature of 20° to 140°C.

40. The process according to claim 38, wherein the first molding comprises the modified thermoplastic vulcanizate elastomer, wherein the first molding is preheated to a temperature of from 20°C to 80°C prior to bonding of the second molding, wherein during the bonding of the second molding the modified thermoplastic vulcanizate elastomer has a melt temperature of 170° to 270°C, and wherein the process is carried out in a mold having a mold temperature of 20° to 140°C.

41. An article comprising a composite body according to claim 22, wherein the composite body is shaped to provide sealing or damping.

The claimed invention requires a modified thermoplastic vulcanizate elastomer comprises:

- (a) 2 to 75% by weight of an at least partially crosslinked ethylene-propylene-diene rubber in from 1 to 50% by weight of a polyolefinic matrix further comprising 0.05 to 10% by weight of an ingredient selected from the group consisting of stabilizers, crosslinking aids, and mixtures thereof;
- (b) 1 to 30% by weight of a compatibilizer; and
- (c) 10 to 70% by weight of a non-olefinic thermoplastic material, all percentages by weight based on a total weight of the modified thermoplastic vulcanizate elastomer (see independent claims 22 and 35).

The applicant's claimed invention requires a polyetherester elastomer (see claim 1). This is not required in the '309 application. The applicant's claimed invention does not require the vulcanizate elastomer as is claimed by '309 application. For this reason alone, the double patenting rejection should be withdrawn.

The claims in '964 application are as follows:

1. A composite article made from polyacetal and from at least one **modified styrene-olefin elastomer**, formed by a polyacetal molding which has to some extent or completely been **coated with the modified styrene-olefin elastomer**, or to which one or more moldings made from the modified styrene-olefin elastomer have been directly molded-on, where **the modified styrene-olefin elastomer is a composition which comprises from 20 to 85% by weight of functionalized and/or non-functionalized styrene-olefin block copolymer, built up from rigid end-blocks of styrene and from flexible middle blocks of olefin, and from 15 to 70% by weight of non-olefinic thermoplastic material, and also at least 5 parts by weight respectively and not more than 200 parts by weight respectively of lubricating plasticizer and/or inorganic filler per 100 parts by weight of styrene-olefin block copolymer**, and wherein the modified styrene-olefin has a Shore A hardness of from 30 to 90. (emphasis added)

2. A composite article as claimed in claim 1, wherein the polyacetal and the modified styrene-olefin elastomer have been adhesively bonded to one another.

3. A composite article as claimed in claim 1, wherein the strength of the bond between the polyacetal and the modified styrene-olefin elastomer is at least 0.5 N/mm^2 .

4. A composite article as claimed claim 1, wherein the polyacetal used comprises a polyoxymethylene copolymer.

5. A composite article as claimed in claim 1, wherein the non-olefinic thermoplastic material has been selected from the class consisting of thermoplastic polyesterurethane elastomers, thermoplastic polyetherurethane elastomers, thermoplastic polyesters, thermoplastic polyesterester elastomers, thermoplastic polyetherester elastomers, thermoplastic polyetheramide elastomers, thermoplastic polyamides, thermoplastic polycarbonates, thermoplastic polyacrylates, acrylate rubbers and styrene-acrylonitrile-acrylate rubbers (ASA).

6. A composite article as claimed in claim 1, in the form of a molding made from polyacetal, which has been entirely or to some extent coated with the modified styrene-olefin elastomer.

7. A composite article as claimed in claim 1, in the form of a molding made from polyacetal, to which at least one other molding made from the modified styrene-olefin elastomer has been molded-on.

8. A composite article as claimed in claim 1, which has been produced by multicomponent injection molding.

9. A composite article as claimed in claim 8, wherein the molding is firstly molded from polyacetal and then a coating or a molding made from the modified styrene-olefin elastomer is injected onto the polyacetal molding.

10. A process for producing a composite article made from polyacetal and from at least one modified styrene-olefin elastomer, where the modified styrene-olefin elastomer comprises from 15 to 70% by weight of non-olefinic thermoplastic material, and where a molding is firstly molded from polyacetal, onto which is then molded a coating or at least one molding made from the modified styrene-olefin elastomer, giving an adhesive bond between the polyacetal and the modified styrene-olefin elastomer.

11. The process as claimed in claim 10, which is a multicomponent injection-molding process carried out in a mold, where the molding made from polyacetal has been preheated to a temperature in the range from 80°C to just below its melting point prior to molding-on of the modified styrene-olefin elastomer, the melt temperature of the modified styrene-olefin elastomer is from 200 to 270°C during molding onto the molding made from polyacetal, and the temperature control of the mold has been set to a temperature in the range from 20 to 140°C .

12. The process as claimed in claim 11, wherein the molding made from polyacetal has been preheated to a temperature in the range from 100 to 160°C, the melt temperature of the modified styrene-olefin elastomer is from 220 to 260°C, and the temperature control of the mold has been set to a temperature in the range from 30 to 80°C.

13. A composite article as claimed in claim 2, wherein the strength of the bond between the polyacetal and the modified styrene-olefin elastomer is at least 0.5 N/mm² and the modified styrene-olefin has a Shore A hardness of from 40 to 80.

14. A composite article as claimed claim 13, wherein the polyacetal used comprises a polyoxymethylene copolymer.

15. A composite article as claimed in claim 14, wherein the non-olefinic thermoplastic material has been selected from the class consisting of thermoplastic polyesterurethane elastomers, thermoplastic polyetherurethane elastomers, thermoplastic polyesters, thermoplastic polyesterester elastomers, thermoplastic polyetherester elastomers, thermoplastic polyetheramide elastomers, thermoplastic polyamides, thermoplastic polycarbonates, thermoplastic polyacrylates, acrylate rubbers and styrene-acrylonitrile-acrylate rubbers (ASA).

16. The process as claimed in claim 10, wherein the modified styrene-olefin elastomer comprises from 20 to 50% by weight of non-olefinic thermoplastic material, and 35 to 70% by weight of maleic anhydride-functionalized and/or non-functionalized tri-block copolymer which have been built up from rigid end-blocks of styrene and from flexible middle blocks of olefin.

17. The process as claimed in claim 16, which further comprises at least 5 parts by weight and not more than 200 parts by weight of a lubricating plasticizer or an inorganic filler or a mixture of the lubricating plasticizer and the inorganic filler, per 100 parts by weight of styrene-olefin block copolymer.

The '964 claimed inventions requires "the modified styrene-olefin elastomer is a composition which comprises

from 20 to 85% by weight of functionalized and/or non-functionalized styrene-olefin block copolymer, built up from rigid end-blocks of styrene and from flexible middle blocks of olefin, and

from 15 to 70% by weight of non-olefinic thermoplastic material, and also at least 5 parts by weight respectively and

not more than 200 parts by weight respectively of lubricating plasticizer and/or inorganic filler per 100 parts by weight of styrene-olefin block copolymer”

The applicant’s claimed composite does not require the modified styrene-olefin elastomer is a composition which comprises

from 20 to 85% by weight of functionalized and/or non-functionalized styrene-olefin block copolymer, built up from rigid end-blocks of styrene and from flexible middle blocks of olefin, and

from 15 to 70% by weight of non-olefinic thermoplastic material, and also
at least 5 parts by weight respectively and

not more than 200 parts by weight respectively of lubricating plasticizer and/or inorganic filler per 100 parts by weight of styrene-olefin block copolymer.

Furthermore, ‘964 claims do not require the polyetherester elastomer (see applicant’s claim 1). For the above reasons, this rejection should be withdrawn.

35 U.S.C. 103(a) Obviousness

Claims 1-12, and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ziegler, in view of EP ‘458 or Mutsada, and in view of Masubuchi.

Ziegler discloses composite articles from polyacetal with directly molded-on functional elements made from one or more thermoplastic elastomers. As the Examiner correctly stated at the bottom of page 5 of the office action, Ziegler does not disclose the use of polyester elastomers.

Mutsada and EP ‘458 disclose a polyacetal composite which includes a polymer composed of a polyacetal resin and a polymer composed of thermoplastic resin or elastomer having an acidic group (see the abstract of both Mutsada and EP ‘458). Mutsada found –after intensive investigations- that heating of a polyacetal resin and a thermoplastic resin or elastomer having an acidic group (only!) permits an interface between the both materials to firmly bind and

fix with each other (see col. 1, lines 44-50 of Mutsada and paragraph no. [0005] of EP '458).

Therefore, a person of ordinary skill in the art will get the information from either Mutsada or EP '458, that it is absolutely necessary that the elastomer (e.g. polyester-based thermoplastic elastomer paragraph [0018] of EP '458) must have acidic groups to improve the adhering of polyacetal resin and an elastomer. Therefore, Mutsada and EP'458 actually teach away from the present invention.

Masubuchi disclosed a thermoplastic elastomer composition comprising

1. 100 parts by weight of thermoplastic polyester elastomer,
2. 3 to 100 parts by weight of modified olefin resin having an epoxy group or a derivative group thereof in its molecule and
3. 10 to 900 parts by weight of a rubbery elastomer selected from the group consisting of an olefin-based thermoplastic elastomers and styrene-based thermoplastic elastomers (see the abstract of Masubuchi).

The Examiner has relied up Masubuchi for the teaching of polyetherester elastomers having a typical hardness of Shore D 32. However, the applicant does not believe that Masubuchi cures the deficiencies of the other references. The thermoplastic elastomer composition in Masubuchi can be used for various molding products having excellent scratch resistance, flexibility, heat resistance ... (see paragraph no. [0001] of Masubuchi).

It was an object of the present invention to provide novel composites which feature high bond strengths. Masubuchi is silent about this problem.

A person of ordinary skill in the art would not get any help from Masubuchi to provide the composition of the present invention, because Masubuchi does not deal with the same problem and discloses a combination which comprises at least three components.

Therefore, it would not have been obvious to apply a certain elastomer namely polyester elastomer on a polyacetal component as asserted by the Examiner. For the above reasons, this rejection should be withdrawn.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 05587-00409-US from which the undersigned is authorized to draw.

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Respectfully submitted,

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